Hereditary anemias in Hawaii: An update

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Since our first report was published in the Hawaii Medical Journal *in the September 1987 issue and was reprinted in the September 1991 special sesquicentennial issue, with the support of doctors in Hawaii and their referrals, our small team has now tested 5,000 people[4]. DNA analyses have been completed in over 1,000 people.*

In this hereditary anemia project, many families have benefitted; every participant has been sent a personalized report. We have learned valuable lessons about the attitudes and cultures of participants[15-18] about the hematological and clinical features of the diverse thalassemias prevalent in Southeast Asians[1, 3, 4, 7-12]; about how best to detect these and how DNA analyses help in confirming or revising diagnoses[4, 5, 7, 9, 10, 12]. Couples at risk for having severely affected children have been counseled, pregnancies at-risk have been tested[8].

The α-thalassemias have major health implications especially for Filipinos who are the most rapidly growing ethnic minority throughout the United States[9].

A special Thalassemia clinic has been established under R Wilkinson MD to provide structured care for transfusion-dependent patients who may need iron-chelation therapy. We showed that Hb H disease from loss of 3 α-globin genes is usually benign, but Hb H/Constant Spring tends to be transfusion-dependent[11].

Data from this project have greatly improved knowledge about the ranges and confidence limits of red cell indices for each diagnostic category, with improved interpretations of individual results. Extensive experience has been gained in using red cell indices and isoelectric focusing to detect α and β thalassemia carriers in adults and infants[1, 7, 10, 12].

Thalassemia incidences in Laotians and Filipinos were calculated far more accurately than had been done previously[3].

Red cell distribution width and red cell zinc protopophyrin by microfluorimetry are shown to be a reliable inexpensive way to screen for iron deficiency, except for some overlap with β-thalassemia heterozygotes and HB H disease cases.

Innovative DNA techniques have been created, including the first reliable method to look for the Constant Spring mutation[6]. This uses the polymerase chain reaction (PCR) to amplify DNA from the tail end of the α_2-globin gene a million-fold in a few hours. The technique has been applied to analyze a few strands of hair sent from patients in India.

We have also devised a novel PCR technique to detect the most common type of single α-globin gene deletion, introducing a strategy that is applicable to any large DNA deletion[2].

For rapid fetal detection of α-globin deletions, we have developed a multiplex PCR technique to amplify the β-globin, α_1 and α_2 globin genes simultaneously from drops of blood or a few fetal cells. This can be completed in one working day[8].

We have adopted 2 useful techniques developed by others. One screens for the most common double α-globin deletion, using a monoclonal anti-ς antibody on a drop of blood[13, 14]. Another uses denaturing gradient gel electrophoresis to define the dozens of mutations in the β-gene that produce the β-thalassemias.

Data from this project have been presented in national and international conferences[1-5, 7-10, 12-18]; several articles have been published[4-7, 10-13, 16-18] and more are being prepared. I was the coordinator and chair of a special workshop on thalassemia screening at the Eighth International Congress on Human Genetics in Washington, DC, in October, 1991.

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PHARMACEUTICAL *(Continued from page 16)*

mission. Intellectual property protection must be strengthened, not weakened as in Canada, and tough action taken against patent pirates.

- *Cut product liability costs.* The high cost of protecting against the possibility of high jury awards in product liability cases adds millions of dollars to drug costs. A reform of the tort laws is needed, including protection against punitive damages for products that have been deemed safe and effective by the Food and Drug Administration.

Conclusion

The Senate Aging Committee's staff is singling out one competitive industry for price controls and weakened patent protection. If their recommendations are enacted, it would have a damaging effect on both health care and U.S. international competitiveness.

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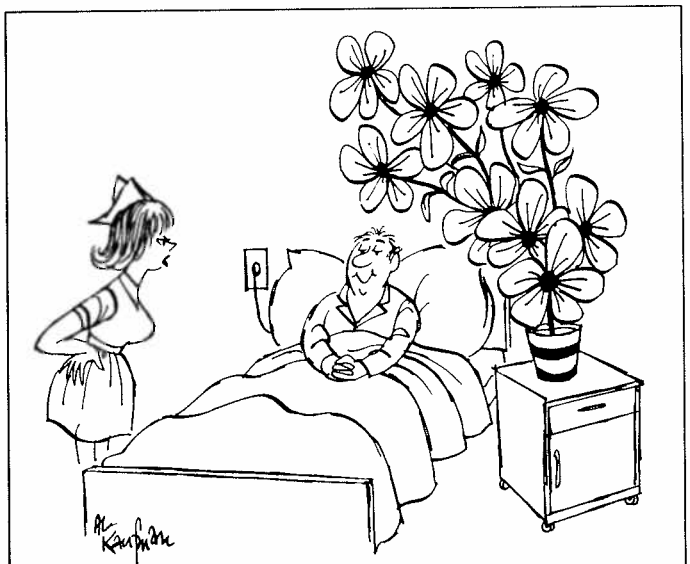

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